Human engagement with forest environments: implications for physical and mental health and wellbeing

Human engagement with forest environments – implications for physical and mental health and wellbeing

Simon Bell and Catharine Ward Thompson

1. Introduction

1.1. The social context: an urbanised and aging population

Sometime around 2008 the proportion of the world's population living in urban areas reached and passed 50% for the first time in human history and this proportion continues to grow (UN Population Fund, 2007). While most developed countries became urbanised some time ago, starting in the late 19th century through processes such as industrialisation and accelerating after the Second World War, for developing countries this trend is relatively recent. The major cities in developing countries also tend to be much larger in scale (mega-cities such as Sao Paolo, Dacca, Mumbai), less-well planned (with many people living in slums) and lacking in many amenities such as clean water, satisfactory drainage and green areas. Even when people do not live in strictly urban areas, many nevertheless have urban values and lifestyles. Thus, the 21st century marks the beginning of an era when we can speak of "urbanised societies" across the globe.

Life in a city has many advantages – more employment opportunities, better access to educational, cultural and leisure resources, better transport and (at least potentially) a life with more leisure time to enjoy these amenities. It can also have many negative aspects ranging from overcrowding, the easy spread of communicable diseases, pollution from gases and particulate matter, large amounts of refuse to dispose of, higher levels of crime and a greater feeling of a lack of security as well as a lower sense of community. The city also provides a constant stream of often unwelcome stimulation – visual, auditory and olfactory - which can be stressful.

The move from a rural area, where life probably consisted of often strenuous manual work and a diet of simple, unprocessed foods, to an urban area, often also leads to a much more sedentary urban lifestyle and a diet of plentiful and cheap food but which may also be high in fat, sugar and salt and low in fibre. The resulting lack of exercise relative to calorie intake has caused a so-called "epidemic of obesity" together with other associated lifestyle diseases or health conditions, such as Type 2 diabetes (Stein and Colditz, 2004). These are factors which place major burdens on health services, more so in the most developed urban societies in Europe and North America, for example, than elsewhere, but this is now increasingly common throughout the world.

The lack of green spaces in early industrial cities in the UK, Europe and the USA was recognised as far back as the 1830s, when public health concerns and a recognition that fresh air and exercise was good for everyone, led to the development of public

parks (Ward Thompson, 1998; 2011). This concern has been with us ever since but urban expansion, uncontrolled sprawl and recent policy shifts towards denser and more compact cities means that green areas are not easily accessible to everyone living in an urban area. In deprived urban areas, even in affluent countries, factors such as poor housing, low-paid work, low levels of educational achievement, high rates of unemployment and poor availability of green areas, frequently go together, leading to a poor quality of life (Department for Communities and Local Government, 2007).

We can make a distinction between purely urban societies – that is the people who live in urban areas and for whom access to green space within the urban fabric might vary according to social and economic as well as spatial factors – and urbanised people in general who may live in more rural or small-town areas, yet at the same time lead an urban lifestyle, whether by choice or necessity (mill towns and mining communities, often now in a post-industrial decline in the western world, are typical of the latter) (Ward Thompson et al, 2004). For both groups, whether they live in so-called 'developed' countries or, as is increasingly the case, in urbanising, developing countries such as China, Brazil or India, a common feature of the urban lifestyle is a loss or diminution of connection with "nature" - that sense of familiarity and frequent engagement (physically and emotionally) with non-urban rural or forest landscapes. Green areas in the urban environment increasingly mean managed parks, gardens and tree-lined streets and perhaps less-managed transport corridors, derelict land or other "unofficial" green spaces. Wildlife may live in these places but they may also be heavily used by people for all sorts of recreation and be dominated by urban sights and sounds, making it difficult to achieve any sense of escape from the urban environment.

The phenomenon of urbanisation also involves large-scale movement of people from the countryside to the cities within countries and from rural areas in one country or continent to urban areas in another (Bell et al, 2011). This is an age of mass-migration, with frequent dislocation of people from their home culture and community into a new and stressful environment. People newly arrived in cities in a strange country may feel they have progressed socially and economically by moving away from rural poverty and they may associate rural areas and forests with the environment they are grateful to have left behind. Others may find that the childhood memories of the countryside or forest lead them to seek out similar places in their new neighbourhood, in order to feel a connection with the home and countries they have left (Silveirinha de Oliveira, 2012). Yet second and third generations of people from rural backgrounds, whether immigrant into a new country or not, may be fully assimilated into their new city and have become thoroughly urbanised, feeling no such association with nature.

One of the great social and medical advances of the last century has been the progressively rising life expectancy of people in developed countries, which has been accompanied by reduced birth rates. This has led to the phenomenon of the "ageing

society" where increasing proportions of the population are over 65 years of age (UK Department for Work and Pensions, 2012). This longevity, as people progress into their 80s or 90s, is accompanied by increasing physical and mental health incapacities which need to be addressed by health services and social support systems. Remaining physically and mentally active into old age is one way to defer such problems and there is increasing interest in environments which offer opportunities for a wide range of activities in which older people can participate.

1.2 The forest and the city

The forest, in one sense, represents the antithesis of the city. Writing in the eighteenth century, in his *Scienza Nuova* (*New Science*)*,* Giambattista Vico claimed "This is the order of human institutions: first, the forests, after that the huts, then the villages, next the cities, and finally the academies" (Vico, 1725, p239). This provides a metaphor for the human relationship with forests which were, and continue to be, cleared to make way for agriculture which has enabled civilisations to arise and so to develop into the urban-dominated environment of today. However, it also suggests that we have a historic relationship with forests which, apart from supplying timber fuel and forage, also provide us with other values – spiritual, aesthetic or recreational, for example. Patrick Geddes, the Scot widely credited as the 'father of town planning', developed the valley section in 1909 as a similar, abstracted expression of what a city in its region represented, with hills or mountains and forested landscape in the uplands, giving way to pastoral and cultivated landscapes before the development of the city, close to the sea. This diagrammatic section represented changes in time as well as in space, but linked the city to the 'natural' or basic occupations of forester, hunter or shepherd, for example, as an illustration of what the ideal city still might be (Ward Thompson, 2006). This link with the natural world has been recognised as important for urban dwellers for as long as cities have existed, it would seem, reflected in Martial's concept of *rus in urbe* in ancient Roman times and in mediaeval discussions of the virtues of access to green and wooded landscapes for good health (Ward Thompson, 2011).

The development of the urban parks movement in the nineteenth century was in large part a response to the cramped and polluted living conditions of factory workers crowding from the countryside into rapidly industrialising cities. Access to parks was not only seen as contributing to physical health and prevention of disease, but also to the psychological and spiritual renewal of the urban working classes (Ward Thompson, 1998). In the mid-nineteenth century, the term "lungs of the city" was cited repeatedly in the service of arguments to develop public parks, whether in Berlin, Paris or New York city. The original use of the term "forest" (in English at least) was as a hunting ground and not as the generally extensively wooded areas as we understand the term today. It is no surprise, then, that for many urban dwellers the forests or wooded areas which were most easily accessible to them for recreation

were former royal hunting forests such as the Tiergarten in Berlin, the Vienna Woods or the Bois de Boulogne outside Paris (Bell et al., 2005, Ward Thompson, 2011).

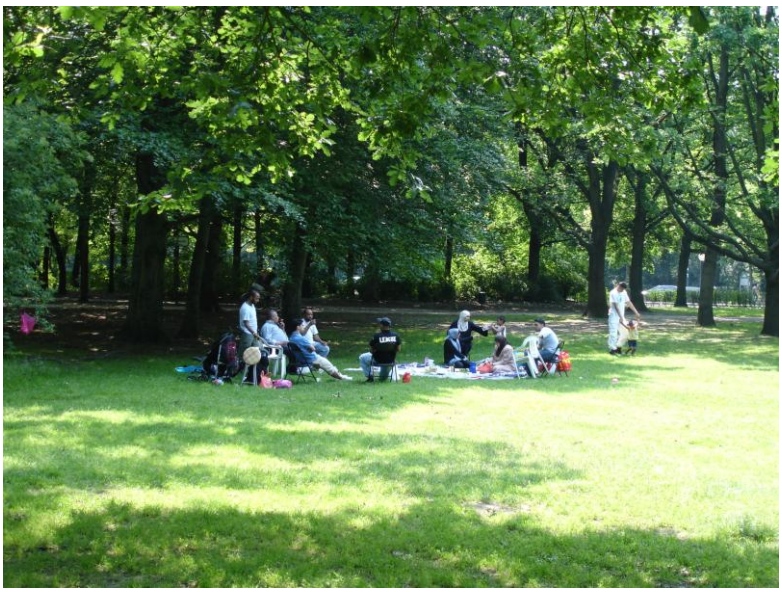

Figure 1 People of Turkish background having a picnic in the Tiergarten in Berlin, Germany, a good example of a former hunting forest now accessible to everyone. People of ethnic minorities frequently use forests differently from the original population (Source: Simon Bell)

Today we recognise that urban dwellers have certain spiritual, recreational and health and well-being needs that can at least in part be fulfilled by natural areas in general, including forests. An increasing amount of research has been undertaken to try to understand how these benefits arise, how important they are and how best to ensure that as many people as possible can obtain them (Ward Thompson, 2011). What stands out is that most research has been carried out in developed countries and that there are great gaps in evidence and understanding, especially in the context of the swiftly urbanising mega-city regions, where little is known of local or regional preferences, needs, demands or supply of social benefits from forests.

2. Different forest types for human engagement and social use.

In recent decades a wide range of types of forest have been recognised, which present a varying set of opportunities and constraints to maximising the social and health benefits they are capable of supplying. Equally, there are different cultural regions where the bonds with forests vary considerably. Adding to the complexity of these inter-relationships, increasing migration means that people may live in countries or regions where their links with the kind of nature they grew up with cannot be maintained. Nonetheless, a useful starting point is to recognise the nature of the forest resource that is potentially available for social use.

Firstly, there are protected “natural” forests, variously categorised as reserves, wilderness areas or parks. These are landscapes where it is possible for those who

have the time and resources, as well as interest, to make the effort to travel there to immerse themselves in as wild or natural an environment as it is possible to find. People using such forests for recreation can also get away from crowds and (whether by choice or necessity) communication technology, find a solitary experience if they wish and practice self-reliance. These kinds of places are epitomised by the designated “Wilderness Areas” in the USA, which are generally managed by the US Forest Service (United States Forest Service, 2012). Since it usually requires a considerable effort to get there, relatively small numbers of people generally benefit but those that do gain considerably from the experience.

Secondly, there are vast areas of managed natural forests, which may be old primary growth or mainly second growth, and which may be managed under industrial conditions primarily for timber or under multiple-objective regimes. These are usually some distance away from urban areas, although some may be within a relatively short drive. Their natural or aesthetic qualities may have been compromised by decades of management, including logging, but if they are managed as certified sustainable forests then they are often accessible (perhaps through their legal status as public land or through a general recognition of the right to public access even to private land for recreation and exercise - “everyman’s rights”). They may be equipped with extensive networks of trails for hiking, skiing or cycling and with parking areas, picnic sites and so on. These kinds of forests are epitomised by those of Finland or Sweden, where outdoor recreation is highly popular and where forests may be within reach of urban centres by public transport, for example the Central Park in Helsinki, Finland, which is a wedge of forest penetrating into the very centre of the city. These countries are also characterised by large amounts of forests relative to small populations. The culture is also strongly associated with forests in all sorts of ways, e.g. through traditions of berry and mushroom picking at different times of year (Vistad et al, 2010).

Thirdly, there are countries and regions where historical clearances of forests for agriculture and urban expansion have led to more recent reforestation programmes, initially for timber production but increasingly to provide multi-purpose forests for a wide range of social and ecological purposes. Some of these forests may be dominated by exotic species of trees while recent trends are to use native ones. Countries with small amounts of forest but large urban populations, such as the UK, the Netherlands or Denmark, are typical of this type. The cultural associations with forests are typically weak in these countries as a result of the long period without substantive woodland cover since clearances took place, as well as the long history of urbanisation (Elands et al, 2010).

Fig. 2 The Vestskogen – or West Forest – in Copenhagen, Denmark, is an example of a relatively new urban forest, planted to provide recreational access as part of the famous Copenhagen "Fingerplan" for the development of the city (Source: Simon Bell)

Fourthly, there are forests close to or within urban areas. These may be tracts of forest which were protected in some way, such as former hunting parks or forests that have become incorporated into the urban fabric, or they may be areas specially planted to benefit the urban population, such as the Black Country Urban Forest in the former industrial heartland of the English Midlands. The concept of the "urban forest" includes not only these kind of wooded areas but also park, street and garden trees – in fact any trees found within the urban envelope (Konijnendijk et al, 2005). This approach has been a significant focus of development in research and urban green space management practice over the last 20 or so years, in both America and Europe, and has also found a role in Asia and elsewhere. With the advance of urbanisation it seems clear that the concept of urban forestry has much to offer and it is unsurprising that such forests are a focus of recent research and efforts. Clearly, these are the areas that are likely to be under most pressure from the forces of urbanisation and also from over-use by urban populations. They also offer possibilities for providing both direct and indirect benefits of many kinds, ranging from benign effects on the urban environment's atmosphere, hydrology and ecology to aesthetic, recreational and health benefits, as will be demonstrated further below.

3. The evidence on health and wellbeing benefits from human engagement with forests

Human engagement with forests clearly goes back many millennia, as Vico succinctly pointed out (Vico, ibid), but in the context of urbanised societies we are less concerned with the contribution that forests may make to basic requirements of

survival and more with what Maslow and others have termed 'higher level' needs (Maslow, 1954) associated with wellbeing, fulfilment and pleasure. Engagement with forests for health and wellbeing can be direct or indirect, active or passive, external (viewing the forest as part of the landscape) or internal (being within it) or a combination of these. There have been several recent, wide-ranging initiatives to try to grasp the multiple facets of these different modes of engagement. The initiatives include three European Union funded COST Actions[1] covering "Urban Forests and Trees", "Forest Recreation and Nature Tourism" and "Forests, Trees and Human Health and Well-being". Each of these produced a range of publications and reports which brought together research and practice, often from widely diverse fields, thereby emphasising the multi-disciplinary character of the subjects (Konijnendijk et al, 2005; Bell et al, 2009; Pröbstl et al, 2010; Nilsson et al, 2011). IUFRO[2] has also focused on this area recently, establishing a Task Force on 'Forests and Health' and also the new thematic research agenda of 'Forests for People' which held its first conference in Austria in May 2012[3] . A Nordic-Baltic network called CARE-FOR-US (Centre for Advanced Research in Forestry Serving Urbanised Societies)[4] is also into its second period of funding and is focussing on various aspects of environmental, social and health benefits in the Nordic-Baltic region.

There is thus a considerable, and growing, literature on themes related to wellbeing and human engagement with forest environments, and an ongoing programme of research to develop better understandings on this theme. This chapter can only touch briefly on each of the different aspects of engagement and wellbeing benefit. Expertise on specific fields is associated with particular research networks linking universities and forest institutes and is often clustered in specific locations or regions around the world.

3.1. Effects on the human physical environment

It is well-known that urban areas develop their own micro-environment. This results in phenomena such as: the so-called "heat island" effect, where temperatures in an urban area can be several degrees higher than in the surrounding rural landscape; increased run-off and localised flooding due to an increase in sealed surfaces; increased air turbulence and windiness, due to the effect of air flows around tall buildings being more extreme; and gaseous and particulate air pollution from vehicle

[1] COST stands for Cooperation in Science and Technology and the system facilitates networking primarily among researchers but also includes practitioners and policy makers.

[2] IUFRO is the International Union of Forest Research Organisations with its secretariat in Vienna. Division 6 is concerned with social aspects of forestry.

[3] http://ffp2012.boku.ac.at/

[4] http://www.nordicforestresearch.org/care-for-us2/

exhaust gases, industrial emissions and domestic heating and cooking sources (particularly in developing countries) (Tyrvainen et al, 2005). These effects can be detrimental to human health and safety and all can be mitigated to a certain extent by the presence of greater proportions of green areas in general and trees in particular, although with some limitations (de Vries, 2010). Shade and evapotranspiration help to cool the urban micro-climate; trees intercept rain and green areas help sub-surface infiltration of water; trees create shelter from or reduce the variability and turbulence of wind gusts, depending on the species and location; and, finally, trees and vegetation trap dust and reduce many aspects of air pollution. However, these positive effects are not universal and in some circumstances there can be negative effects, such as when poorly sited trees trap pollutants at street level and prevent them from dissipating (Sieghardt et al, 2005) or where trees produce aromatic hydrocarbons or pollen or harbour insects which may provoke allergic reactions in some people. Trees planted in order to provide benefit in one way may cause a problem in another due to poor positioning or poor choice of species, so there remains a need for research to improve the efficiency and minimise unwanted side-effects of the urban forest in this regard.

Fig. 3 Street trees in Bordeaux, France, are part of the "urban forest" and help to provide much needed shade and to trap dust, among other benefi ts to the urban microclimate (Source: Simon Bell)

Despite certain limitations of the sort just described, the many benefits of trees in cities are clear, and may seem self-evident to forestry and tree professionals. Yet their overriding benefits may not be so evident to engineers, planners or architects who may yet need to be convinced of the case. With the current, widely-applied policy focus on urban densification (Rogers et al.,1999), green areas may be squeezed out of cities. Yet if urban areas become more compact, with a higher density of residents, then the need for a better urban micro-environment becomes greater, not less, and the case for a strong green infrastructure which is not just

mown grass, i.e. that includes trees and their many benefits, needs to be made more strongly. Further work on establishing the economic justification of urban green and urban forest areas in this area of benefits is also needed.

3.2 Aesthetic aspects of forests and trees

Forests and trees are major elements of the landscape. In this context, the term 'landscape' is taken from that of the European Landscape Convention – "An area of land as perceived by people which has arisen as the result of natural and/or human processes…" (Council of Europe, 2000). This emphasis on perception is an important aspect and should be understood as differentiating the term landscape as used here from that commonly used in landscape ecology. Aesthetic preferences for both external views – the forest as scenery – and internal views – as experienced from paths or tracks within the forest - have been researched for many years and a significant body of practice has also been built up that draws on understandings of preference, especially in those countries where forest management activities which cause major changes to the landscape have been, or continue to be, common (Bell and Apostol, 2008). This principally means practice that pays attention to the landscape implications of logging and associated activities such as road construction in managed natural forests and planting, logging and road construction in plantation forests.

The main foci of research into, and implementation of, aesthetic or visual design principles have been the USA, the UK, Canada, Australia and Scandinavia. The main concerns have been about the perceived reduction in "naturalness" by the introduction of plantation elements with geometric shapes into the landscape as well as the impact in closer views of logging activities (such as debris). Aesthetics as a subject lies at the interface of philosophy, environmental psychology and landscape design and involves many factors. Primarily it is concerned with the pleasure obtained from looking at or experiencing the landscape (Bell, 2012). Forests, because of the way that trees enclose the observer, screen or focus views and contribute to a multi-sensory "engagement" with the environment, create specific aesthetic conditions. Much empirical research has involved carefully controlled studies of preferences for different scenes or management interventions, mainly using photographs or visualisations of different landscape types or forest management activities (Daniel and Boster, 1976; Karjalainen & Tyrvainen, 2002). Most studies reveal similar results across a range of cultures, although there are differences (Koshaka & Flitner, 2004; Han, 2007). However, the focus of work in Western countries leaves many gaps in understanding the role of forest aesthetics in other cultures and also how such concerns emerge as countries become more developed, as tourism values associated with scenery take on more importance and as middle classes emerge who have time and inclination to be concerned about aesthetic qualities. Thus there is considerable research needed to extend the

understanding of these issues in different cultural contexts across the globe (Ward Thompson, 2012).

Fig. 4 The aesthetic enjoyment of being in a forest – in this case a managed one in Estonia –enables us to relax and provides a valuable setting for other forms of engagement, both physical and psychological (source: Simon Bell)

The urban forest can play a different aesthetic role, above and beyond those considered above. Here the presence of trees in streets, parks and gardens can serve to introduce natural and green elements into an environment otherwise dominated by built forms and artificial elements (Bell et al, 2005). The wealthier residential areas in almost all cities are also leafy or have views from houses and apartments which include substantial amounts of green vegetation, with trees having a dominant role due to their height and longevity. Studies have shown that houses with views of trees and green spaces tend to sell for higher prices so, in this respect, trees as aesthetic objects can also have a market value which can be calculated (Tyrväinen and Miettinen, 2000). However, these studies are limited in number and geographic coverage and more research is needed in order to be able to obtain a better idea of the degree to which these relationships can be generalised across countries and cultures.

3.3. Restorative environments and the psychological benefits of nature experiences.

A comparatively recent field of research focuses on the “restorative” effects of the natural environment (Hartig, 2007; Hartig et al, 2011). The attention restoration theory of Rachel and Stephen Kaplan (Kaplan and Kaplan, 1989; Kaplan, 1995) is one approach to explaining why certain types of environments, particularly natural ones, appear to be effective in stress reduction and restoration from fatigue. The theory suggests that directed attention used in coping with complex patterns of daily

life, including work, is a highly limited resource, easily exhausted if there are not opportunities for recovery. People recover best in environments where this system can rest and where they can use another type of attention – involuntary attention or 'soft fascination' - which the natural environment is particularly well-suited to supporting. There is evidence to show that, for people suffering from mental fatigue, looking out of a window at a scene which includes natural elements such as trees, or perhaps sitting for a while in a garden surrounded by plants and trees, speeds up the restoration compared with a break where only built elements are visible. This demonstrates the potential for urban trees to contribute to improved well-being, to say nothing of employees' productivity, when more people work in jobs which require sustained periods of concentration. As the number of people working in such jobs – often involving IT - increases globally, the potential benefits are significant yet the research has only begun to scratch the surface.

It is not only work which can be stressful; merely living in an urban environment can include exposure to many psychological stressors, as noted in the introduction. "The struggle to pay attention in cluttered and confusing environments (such as crowded urban ones) turns out to be central to what is experienced as mental fatigue" (Kaplan and Kaplan 1989, p. 182). Research is beginning to show how viewing a forest scene compared with an urban scene can have positive effects on physiological indicators of stress such as blood pressure and hormone levels.

Such evidence builds on theories such as the biophilia hypothesis (Kellert & Wilson, 1993) and theories and models suggesting that the human response to the environment is strongly rooted in our evolutionary origins (Orians & Heerwagen, 1992; Ulrich, 1999). A psycho-evolutionary basis for the benefits of engagement with natural environments is supported by the strong evidence for physiological and psychological responses to perceiving nature which are thought to take place via psychoneuroendochrine mechanisms, independent of conscious activity choice. Being in or viewing wooded or natural environments has been shown to reduce physiological measures of stress including blood pressure, heart rate, skin conductance and muscle tension (Ulrich et al., 1991; Hartig et al., 2003; Ottosson and Grahn, 2005). In Japan, a study exploring the effect of a walk in the forest ('Shinrin-yoku' - taking in the forest atmosphere) has shown that such environments can promote lower concentrations of cortisol, lower pulse rate, lower blood pressure, greater parasympathetic nerve activity and lower sympathetic nerve activity when compared to city environments (Park et al., 2007; 2010; Lee et al, 2011).

Recent, innovative work in the UK has shown how higher levels of green and natural space in deprived urban communities are linked with lower stress, measured both subjectively and objectively, using diurnal patterns of cortisol secretion (Ward Thompson et al, 2012). Diurnal cortisol patterns indicate everyday circadian rhythms of health and are sensitive to the longer term effects of stressors in the social and physical environment; the patterns will reflect any hormone dysregulation that is

associated with conditions such as clinical depression or chronic stress. Thus, an association between access to natural environments and healthy cortisol cycles is particularly compelling in suggesting that spending time in natural environments such as forests may help to reduce mental and psychological ill-health. An epidemiological study of a large, general population sample from across Scotland has shown that physical activity in natural environments is associated with a reduction in the risk of poor mental health to a greater extent than physical activity in other environments, and that regular users of woodlands or forests for physical activity were at about half the risk of poor mental health of non-users (Mitchell, 2012).

Forest settings have also been shown to benefit children and adolescents, especially those with behavioural problems and mental disorders who can be highly disruptive in conventional school settings. A recent, comparative study with children aged from 10 to 13 years showed that the forest setting was advantageous to mood in all behaviour groups but particularly in those children suffering from 'mental disorder' (Roe & Aspinall, 2011a). Detailed analysis of a small group of children with severe behavioural problems illustrated how the forest setting offered opportunities for curiosity, creativity, exploration and challenge, opportunities largely missing in these young people's lives to date, and how the setting allowed therapeutic processes to occur naturally, without professional intervention (Roe & Aspinall, 2011b). These are important findings for today's urbanized society, where a childhood without access to woodlands and natural places may contribute to the difficulties young people and adults experience later in life (Ward Thompson et al, 2008).

Fig. 5 Pre-school children in Austria attending a forest kindergarten. They are able to become familiar with the forest and nature and studies have shown that there are benefits from such engagement from an early age (Source: Simon Bell)

3.4 Forests, physical activity and health

The sedentary lifestyle of modern Western societies is contributing to the epidemic of obesity and poor cardio-vascular health, such that a major focus of public health organisations is to increase physical activity (Pate et al., 1995; Department of Health, 2004; U.S. Department of Health and Human Services, 2008). Motivating people to take more exercise is proving difficult in many circumstances and it seems that part of this has to do with the environment in which the exercise takes place as well as barriers such as cost or the accessibility of places in which to exercise. Findings from a cross-European study showed that the quality of the landscape appears to influence physical activity (Ellaway et al., 2005). In urban areas, people may go to parks or other open spaces for exercise and these may be very busy in some cities. The attractiveness of a forest is that it provides a much more pleasant ambience for physical activity and, if it is large enough, it can accommodate a range of different forms of recreation which promote physical health, mental restoration and aesthetic pleasure all at once. Research on local woodland use by communities in Scotland showed that the predominant use is for walking and cycling, suggesting that forests can play a key role in maintaining healthy and active lifestyles for all ages and both sexes (Ward Thompson et al., 2004: 2005). Compared with streets or small open spaces, forests provide a much more pleasant environment with less pollution, cleaner air to breathe while exercising and potentially the beneficial effects of aromatic hydrocarbons.

In countries with a strong cultural association with forests, such as Finland, forests may be the location of choice for outdoor recreation and exercise and children are brought up able to ski cross-country and be comfortable with the forest environment. This familiarity means that they frequently develop the habit of visiting forests and gaining multiple benefits from this. In other countries where there is less forest and less of a cultural connection, forests may be less attractive, so that people may miss out on the benefits. Fear of crime, of being attacked or getting lost may be a major barrier, especially to women in some urban environments, while children may be discouraged or prevented from playing in woods owing to safety concerns (Ward Thompson et al., 2004). However, a North American study of women's experience of exercise such as running or cycling showed that it was more enjoyable and meaningful in a large park with many woodland trees, compared to in the street, because of the beautiful scenery and the therapeutic or spiritual experience associated with the park's aesthetic qualities. The park afforded a traffic-free environment where women felt freer to dress comfortably and generally less susceptible to unwelcome remarks (Krenichyn, 2006).

4. Broader aspects of forest recreation

Forests, because of public ownership or everyman's right of access, often provide extremely valuable opportunities for general recreation across the spectrum of

potential activities, from relaxing, sitting or walking the dog to jogging, cycling or skiing, etc., which may include obtaining aesthetic pleasure, restoration, reduction of stress and obtaining physical exercise. Forests also provide a good setting for family or friends' groups and social activities such as children's play, picnicking or having a barbecue. Indeed, the woodland environment seems to offer particularly rich opportunities for inter-generational activities, such as grandparents and their grandchildren sharing knowledge about the natural environment, and for children's play that has different, multisensory qualities that distinguish it from play in conventional urban environments or playgrounds (Ward Thompson et al., 2004; Ward Thompson et al., 2008). As mentioned earlier, forests can provide opportunities for activities and freedom of movement for teenagers and young adults that may be important for their development and difficult to provide for in the conventional urban environment (Bell et al., 2003).

The kind of activity taking place in forests varies according to social and cultural contexts. In countries with large numbers of people of immigrant origin from different cultural backgrounds, there may be rather different demands for recreation than those commonly undertaken by the majority population. In some cases, as noted in the introduction, some ethnic groups may not use forests or other outdoor space at all. This may be for a variety of reasons and attempts to understand this phenomenon and to increase the use of green spaces including forests and woods among minority ethnic groups have met with mixed success (CABE, 2010). In some cultures, such as Muslim communities, young girls and women generally stay at home or indoors and, if they go to parks or green areas, they need to be there in the company either of male relatives or only of other women. This clearly limits the possibilities of these groups participating in outdoor recreation, unless special areas are set aside for them or the environment offers opportunities for separate use of different spaces, a demand highlighted in some cities in the UK (CABE, 2010). Forests and wooded parks have the benefit of providing visual screening that can offer such spatial differentiation and may therefore be particularly valuable in providing opportunities for different cultural groups to enjoy outdoor recreation within comparatively private family groupings.

The ageing demographic of the global population means there is increasing interest in environments that support healthy activity into old age. Maintaining physical activity is an important way for older people to remain fit and healthy and for preventing or reducing the impact of a range of problems such as osteoporosis in women (Simonsick et al., 2005; Sugiyama and Ward Thompson, 2008). Studies have shown that the presence of attractive trees and vegetation in a local park may be a significant attraction for walking in an older population, as for younger age groups. However, the physical conditions of accessibility to natural areas such as forests must be considered. The surfaces and gradients of paths, the provision of benches at regular intervals, hand rails along paths with steeper gradients and provision of sufficient information explaining the lengths and conditions of paths have been found

to be important aspects to be considered when planning to make areas accessible for older people (Aspinall et al., 2010).

Fig. 6 Older people benefi t a lot from physical exercise – here older Dutch people are taking it seriously in a state forest (Source: Jan Blok)

There are also people with a wide range of disabilities whose needs must be considered. This includes people with mobility impairment, making walking difficult or impossible, people who are blind or visually impaired, those who are deaf or hard of hearing, and people with a range of cognitive impairments or mental disabilities. People with some form of disability are often poorly provided for so that they are either unable to visit or to fully enjoy the outdoors. Enough is now known about how to provide support for many aspects of impairment so that people with a disability can benefit from the rich experience of a forest visit; the main problems are probably lack of awareness among planners and managers and lack of funds to implement special facilities.

Fig. 7 Disabled people may need special equipment or better surfaces to access the forest but they gain a lot from being able to visit (Source: Simon Bell)

5. Social and community engagement with forests

In many countries so-called “community forests” are an important element of the forest estate. In developing countries these may be substantial areas managed for the benefit of local communities and be important sources of food, fodder, grazing and fuel and also providers of non-timber forest products with an economic value. In developed, Western countries, such areas tend to be smaller and to fulfil different objectives. A community forest generally means one managed by, as well as for, the benefit of the local community and the focus may be on recreation, nature conservation and social engagement. When woodlands in and around towns are planned and managed by local people they offer many benefits over and above the recreation and health ones already discussed above. These may include the possibilities to work together in a socially valuable endeavour, to make a personal or communal investment into something with long-lasting and growing benefits for future generations, for communities from different backgrounds to mix and work together, to introduce children to nature and generally to obtain altruistic feelings of caring for nature and the environment. Such projects include the Forestry Commission Scotland’s programme for ‘Woods In and Around Towns’ (WIAT), focused on the more deprived urban communities in Scotland, where social capital and cohesion may arise from investment in physical and social infrastructure and community engagement with forest maintenance and woodcraft skills, above and beyond any benefits from mental or physical health (Roe & Ward Thompson, 2010; Ward Thompson et al., under review).

6. Challenges for the future

The ranges of benefits to health and wellbeing discussed in this short overview reveal a developing field of knowledge which has not been ignored by policy makers or practitioners in some countries but which still needs much more research and promotion. The challenges can be considered under two aspects: breadth and depth.

The breadth of the understanding of and research into human engagement with forests, as has been noted above, has tended to be focussed in major developed countries such as Europe, North America, Australasia and Japan. The influence of organisations such as IUFRO has made sure that forest research agencies and institutions in a wide range of countries can network and focus on all fields of forest research but, understandably, given the different priorities in developing countries, the area of human engagement as discussed in this chapter has been lower on the list of priorities. However, with rapid rates of development in countries such as India and China, the rapid urbanisation as noted in the introduction and the increasing numbers of middle-class people employed in jobs which produce the same sedentary conditions and same mental stresses as those experienced in developed post-industrial regions, it seems clear that the research and policy focus described in this chapter should be expanded more widely. The research findings from the regions where this has been carried out may be generally transferable but there may be important environmental and cultural differences which mean that repeating studies in different conditions would add to the evidence base in valuable and distinctive ways.

The issue of depth of research arises from the increasing need to establish evidence of a quality that is recognised as valid in the world of public health and medical research, where standards and expectations of research methods, sample sizes, experimental design and statistical validity are frequently much more demanding than those of forestry, for the simple reason that human lives may be at risk from poor research conduct. This issue has been already recognised and some innovative, trans-disciplinary research is being undertaken, but it is still an important issue for the future (Ward Thompson, 2011). Identifying research priorities for green and public space, including urban forests, has been carried out already, e.g. by Bell et al (2007), and recently the European Forestry Institute conducted a research foresight exercise about urban forestry, the results of which will be published at some point[5].

A further challenge is that of translating research into aspects such as the health benefits of forest environments into practice, and in using practice to inform research. The obstacles arise as a result of the different traditions, expectations, languages

[5] http://www.nbforest.info/news/efinord-and-care-us-networks-join-forces

and limited experience of these disciplines working together (Van Herzele et al, 2011). There are some examples from Europe but these are sporadic and not necessarily sustainable (Bell et al, 2011). More work, especially using action research approaches would help to strengthen the evidence base.

Conclusions

The subject field of human engagement with forest environments for physical and mental health and well-being is, in some senses, surprisingly well-developed and has seen an upsurge in research and application in the last decade or so. The issue is also rising up the research and policy agenda because the world is becoming much more urbanised and the results of urban lifestyles are causing concern in terms of health, well-being and quality of life. Forests have been demonstrated to play a key role, along with other forms of green space, in many aspects of environmental support for healthier lifestyles. However, the focus of research in developed countries and the still weak connections with the health-related professions are issues that need to be addressed and which cause complexities and difficulties for achieving the best possible outcomes. Awareness that the natural environment, and forests in particular, might play a role in enhancing health, and perhaps prevent illness at a fraction of the cost of post hoc medical intervention suggests that research into the salutogenic aspects of forest environments for human society is an urgent need in an urban world.

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